CLAIMS:

1. Nanostructure having at least one elongated structure element comprising a first material, where said elongated structure element bears on at least one of its end portions a second material that differs from said first material in at least one property selected from: electrical conductivity, chemical reactivity and composition .

2. Nanostructure according to claim 1 wherein the second material is metal or metal alloy.

3. Nanostructure according to claim 2 wherein said at least one property is electrical conductivity.

4. Nanostructure according to claim 2 wherein said at least one property is chemical reactivity.

5. Nanostructure according to claim 1 wherein the second material is conductive polymer or insulating material.

6. Nanostructure according to claim 1 wherein the second material is semiconductor.

7. Nanostructure according to claim 5 or 6 wherein said at least one property is selected from electrical conductivity and composition.

8. Nanostructure according to claim 5 or 6 wherein said at least one property is chemical reactivity.

9. The nanostructure of claim 1, wherein said first material is selected from semiconductor material, insulating material, metal and mixtures thereof.

10. The nanostructure of claim 9 wherein said first material is a semiconductor material.

11. The nanostructure of claim 10 wherein said semiconductor material is selected from Group II-VI semiconductors, Group III-V semiconductors, Group IV-VI semiconductors, Group IV semiconductors, alloys made of these semiconductors, combinations of the semiconductors in composite structures and core/shell structures of the above semiconductors.

12. The nanostructure of claim 11 wherein said nanostructures are made from Group II-VI semiconductors, alloys made from Group II-VI semiconductors and core/shell structures made from Group II-VI semiconductors.

13. Nanostructure according to claim 6 having at least one elongated structure element comprising semiconductor material and having formed on at least one of its end portions a second material that is semiconductor and differs from said first semiconductor material in at least one of the following properties: electrical conductivity, chemical reactivity, band gap and composition.

14. The nanostructure of anyone of claims 1-4 wherein said second material is metal.

15. The nanostructure of claim 14 wherein said metal is a transition metal.

16. The nanostructure of claim 15 wherein said transition metal is selected from Cu, Ag, Au, Pt, Co, Pd, Ni, Ru, Rh, Mn, Cr, Fe and Ti and alloys thereof.

17. The nanostructure of anyone of claims 1-16 having an elongated shape selected from rod, bipod, tripod, tetrapod, nanowire and nanotube.

18. The nanostructure of anyone of claims 1-16 in the form of a nanorod.

19. The nanorod of claim 18 comprising a first material being CdSe or CdSe/ZnS in a core/shell layered arrangement, an elongated structure element of said nanorod bearing on at least one of its end portions an electrically conductive zone made of gold.

20. The nanostructure of anyone of claims 1-16 in the form of a tetrapod.

21. The tetrapod of claim 20 comprising a first material being CdSe or CdSe/ZnS in a core/shell layered arrangement, an elongated structure element of said tetrapod bearing on at least one of its end portions an electrically conductive zone made of gold.

22. A method for forming a zone on at least one end portion of a nanostructure, wherein said zone differs from the whole nanostructure, the method comprising: contacting a solution comprising nanostructures composed of at least one elongated structure element, with a solution comprising an agent

selected from metal source, metal alloy source, conductive polymer source, insulating material source and semiconductor source, to obtain upon isolation nanostructures bearing at least one zone on said at least one elongated structure thereof that differs from the nanostructure in at least one property selected from: electrical conductivity, chemical reactivity and composition.

23. A method according to claim 22 comprising: contacting a solution comprising nanostructures composed of at least one elongated structure element, with a solution comprising metal source or metal alloy source , to obtain upon isolation nanostructures bearing at least one zone comprising metal or metal alloy on said at least one elongated structure thereof.

24. The method according to claim 22 or 23 wherein said nanostructure is made of a first material comprising semiconductor material, insulating material, metal or mixtures thereof.

25. The method according to claim 24 wherein said first material is semiconductor material.

26. The method according to anyone of claims 22-25 wherein said nanostructure has an elongated shape.

27. The method according to claim 26 wherein said elongated shape comprises rod, wire, tube and branched shape.

28. The method according to claim 27 wherein said branched shape comprises bipod, tripod and tetrapod.

29. The method according to claim 25 wherein said nanostructure is made of a first material that is a semiconductor material selected from Group II-VI semiconductors, Group III-V semiconductors, Group IV-VI semiconductors, Group IV semiconductors, alloys made of these semiconductors, combinations of the semiconductors in composite structures and core/shell structures of the above semiconductors.

30. The method according to claim 29, wherein said nanostructure is made of a first material selected from Group II-VI semiconductors, alloys made from

Group II-VI semiconductors and core/shell structures made from Group II-VI semiconductors.

31. The method according to claim 24 wherein said nanostructure is made of a first material that is an insulating material selected from oxides and organic polymers.

32. The method according to claim 23 wherein the metal or metal alloy source solution further comprises at least one agent selected from electron donor, surfactant and stabilizer.

33. The method according to claim 32 wherein said surfactant is a cationic surfactant.

34. The method according to claim 32 wherein said stabilizer prevents aggregation of nanoparticles during the formation of an electrically conductive zone on a nanostructure.

35. The method according to claim 33 wherein said stabilizer is selected from ammonium salts, alkyl pyridinium alts and quaternary ammonium salts.

36. The method according to claim 32 wherein said stabilizer or said surfactant serves as electron donor.

37. The method according to claim 23 wherein said metal or metal alloy source comprises a transition metal element.

38. The method according to claim 23 wherein said metal or metal alloy source is a salt of a transition metal or transition metal alloy.

39. The method according to claim 38 wherein said transition metal is selected from Cu, Ag, Au, Pt, Co, Pd, Ni, Ru, Rh, Mn, Cr, Fe, Ti and alloys thereof.

40. The method according to claim 38 wherein said metal or metal alloy salt is first dissolved in an organic solvent comprising a surfactant and/or a stabilizer and/or electron donor to give a mixture which is subsequently added in a controllable manner to the nanostructures solution.

41. The method according to claim 32 wherein said electron donor is an organic compound.

42. The method according to claim 41 wherein said electron donor is selected from aliphatic amine, hydride and ascorbic acid.

43. A method for forming an electrically conductive zone on a nanostructure having at least one elongated structure element, the method comprising: contacting, an organic solution comprising semiconductor nanostructures with an organic solution comprising a metal or metal alloy source, a stabilizer and/or surfactant and/or electron donor to obtain upon precipitation semiconductor nanostructures bearing at least one electrically conductive zone comprising metal or metal alloy on said at least one elongated structure thereof.

44. The method according to claim 43 wherein said nanostructures are in the form of nanorods, bipods, tripods, tetrapods, nanowires or nanotubes.

45. The method according to claim 43 wherein said semiconductor nanostructures are made of a material comprising elements of Group II-VI, alloys of such elements or core-shell layered structures thereof.

46. The method according to claim 45 wherein said semiconductor nanoparticles are made of a material comprising CdSe, CdS, CdTe, alloys thereof, combinations thereof or core/shell layered-structures thereof.

47. The method according to claim 43 wherein said electrically conductive zone comprises a metal selected from Au, Ag, Cu, Pt, Co, Pd, Ni, Ru, Rh, Mn, Cr, Fe, Ti, mixtures of such metals and alloys of such metals.

48. Article of manufacture comprising the nanostructure of anyone of claims 1-21.

49. An electronic device comprising the nanostructure of anyone of claims 1-21, or into which the nanostructure of anyone of claims 1-21 is integrated.

50. An electrode comprising the nanostructure of anyone of claims 1-21.

51. A transistor comprising the nanostructure of anyone of claims 1-21.

52. A field effect transistor comprising the nanostructure of anyone of claims 1-21.

53. An optical device comprising the nanostructure of anyone of claims 1-21, or into which the nanostructure of anyone of claims 1-21 is integrated.

54. Self assembled construct comprising a plurality of nanostructures according to anyone of claims 1-21, wherein each nanostructure is linked to another nanostructure in the construct through its conductive zone.

55. Nanostructure according to anyone of claims 1-21 in the form of nanorod made of semiconducting material, said nanorod carrying on at least one of its end portions an electrically conductive zone comprising a metal or metal alloy material.

56. Nanostructure according to anyone of claims 1-21 obtainable by the method of claim 22.

57. Nanostructure according to anyone of claims 1-21 obtainable by the method of claim 23.

58. Nanostructure according to anyone of claims 1-21 obtainable by the method of claim 43.